

[Name of Document]    Claims

1.    A rotatable duct type shrouded rotating wing having a shrouded rotating wing and its an opening size (hereinafter referred to as "caliber" ) exceeding a radius of approximately 3 m and based on a linear motor driving principle, said rotary type shrouded rotating wing comprising the following shroud, rotary duct, rotatable support portions, hub or the like, and rotor blades, as main components:

(1)    a shroud with electromagnets able to form a rotating magnetic field being arranged annularly in the interior thereof;

(2)    a duct that is rotatable (hereinafter referred to as "rotatable duct") with permanent magnets and rotor blades connected to outer and inner periphery portions thereof respectively, said rotatable duct having a shape such that in the vertical direction (the direction orthogonal to a rotating surface, i.e., vertical direction) the rotatable duct is in contact with said shroud constantly, while in the horizontal direction (the direction parallel to the rotating surface, i.e., lateral direction), the rotatable duct encloses the inner periphery portion of said shroud while normally maintaining an appropriate contactless space to permit expansion and contraction of the rotatable duct;

(3) a support portion that is rotatable (hereinafter referred to as "rotatable support portion") formed in the shape of a cylinder sandwiching said rotor blades in the vertical direction (the direction orthogonal to the rotating surface, i.e., vertical direction), said rotatable support portion being connected at a central portion in the vertical direction (the direction orthogonal to the rotating surface, i.e., vertical direction) of the cylinder to said rotor blades and being in contact at both ends in the vertical direction (the direction orthogonal to the rotating surface, i.e., vertical direction) of the cylinder with a fixed support portion, thereby holding the rotor blades in the vertical direction (the direction orthogonal to the rotating surface, i.e., vertical direction) to prevent the rotor blades from being deflected or distorted by their own weight and permitting limitation to the influence of both centrifugal force and heat with respect to expansion and contraction of said rotatable duct which should be coped with, said rotatable support portion being rotatable together with said rotor blades while both ends in the vertical direction (the direction orthogonal to the rotating surface, i.e., vertical direction) of the cylinder are kept in contact with the fixed support portion;

(4) a hub or a central shaft (hereinafter referred to as

“hub or the like” ) positioned at the center of rotation of said rotor blades by the fixed support portion to connect wing center portions of the rotor blades; and

(5) said rotor blades, the rotor blades having wing tips connected to the inner periphery portion of said rotatable duct and wing center portions connected to the hub or the like, the rotor blades having said rotatable support portion in a ratio of one said rotatable support portion at every about 2.5 m halfway on blades thereof from the direction of said wing center portions to said wing chip,

wherein, even in an environment involving a rapid change of a blow-off direction of the shrouded rotating wing, lift and thrust which the rotor blades connected to the rotatable duct generates can be obtained always stably irrespective of the caliber or a mounted state of the shrouded rotating wing to a flying body, or the blow-off direction.